Curriculum Vitae
&
Faculty Personal Record

Amro M. Farid

Associate Professor of Engineering

THAYER SCHOOL OF ENGINEERING AT DARTMOUTH | LINES LABORATORY FOR INTELLIGENT INTEGRATED NETWORKS OF ENGINEERING SYSTEMS EMPOWERING YOUR NETWORK

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14 Engineering Dr
Hanover, NH 03755

Email: amfarid@dartmouth.edu, amfarid@mit.edu
Cell Phone: +1 (646) 724-0264
Office Phone: +1 (603) 646-1524
Skype: amfarid0824

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The latest version of this document may be found at:
http://engineering.dartmouth.edu/liines/resources/fprSys.pdf
or
http://amfarid.scripts.mit.edu/resources/fprSys.pdf

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1 Executive Summary

1.1 Principal Area of Expertise

The application of control, automation & operations research to intelligent multi-energy engineering systems.

1.2 Professional Mission

The LIINES (Laboratory for Intelligent Integrated Networks of Engineering Systems) is devoted to the enhancement of sustainability & resilience in intelligent multi-energy engineering systems. We seek to develop an internationally recognized, locally relevant and industrially-facing program of research that engineers intelligent & integrated control, automation, and information technology systems that support the design, planning, and operations of such large-scale multi-energy engineering systems. These activities encourage and facilitate technology policy that supports the achievement of energy, water, transportation & industrial policy objectives while eliminating barriers to sustainable and resilient solutions founded in a digital and shared economy.

1.3 Research Overview

Upon joining the Thayer School, this faculty personal record had only 76 refereed publications (61 produced in the 5 years prior to Dartmouth). 5 years later, this faculty personal record now includes 147 refereed publications; an increase of 116%.

- 5 Books *up from 2* ,
- 11 Book Chapters *up from 4*,
- 45 Journal Papers *up from 16*,
- 76 Conference Papers *up from 47*,
- 2 Technical Standards *up from 2*,
- 8 Invited articles and Op-eds *up from 5*.

Collectively, the work has been cited 2586 times (522 times in 2019 alone). These publications have lead to 6 keynote presentations, 68 invited industrial presentations and 60 invited academic presentations. The key achievements of these publications are organized into five research themes:

- smart power grids,
- energy-water nexus,
- electrified transportation systems,
- supply chain energy management,
- interdependent smart city infrastructures,

and are detailed at the links above.

Since 2017, the Laboratory for Intelligent Integrated Networks of Engineering Systems (LIINES) has secured $4,022,371 of external funding of which $1,857,968 was as a PI. Over the course of my career as a professor, the LIINES' has raised $4,849,784 of which $2,685,381 was as a PI.

1.4 Teaching Overview

Since coming to the Thayer School of Engineering, I have taught ENGS 175 Energy Systems in the Spring term and ENGS 22 Systems in the Fall term. Both required major revisions when I first taught them. I have also recently developed a new course ENGG 199 Model-Based Systems Engineering for Winter 2018.

At the Masdar Institute of Science & Technology, I developed ESM 501 Systems Architecture and ESM 616 Techno-Economic Analyses in Power Systems Operations & Planning as new courses and then taught them alternatively for every semester there.

Over my academic career, I have personally advised, co-advised, or served on the committee of 82 students:

- 16 First Year Students
- 2 Bachelor's Thesis
- 15 Master's Theses
- 7 Doctoral Theses
- 5 Post-docs
- 2 Undergraduate capstone projects
- 24 Undergraduate researchers
- 3 Engineering management projects
- 5 Graduate researchers
- 3 Summer interns

1.5 Professional & Academic Service Overview

At the Thayer School of Engineering and more broadly at Dartmouth, my academic service has generally served to advance topics related to energy and engineering management.

At the Masdar Institute of Science & Technology, my academic service was greater given the university's start-up nature. These included 6 department roles, and 4 university roles; most notably: Chairperson of the ESM Admissions Committee and Member of the MI Research Council.

Professionally, I have demonstrated service leadership with terms as

- Chair of CESUN (Council of Engineering Systems Universities),
- Chair of the IEEE Smart Cities Technical Activities Committee,
- Co-Chairperson of the IEEE Systems, Man & Cybernetics Technical Committee on Intelligent Industrial Systems,
- Chair of the IEEE Power and Energy Society Smart Buildings, Loads, and Customers Architecture Committee, and
- Chairperson of the IEEE CSS Technical Sub-Committee on Renewable Energy in Smart Grids.

2 Professional Profile

2.1 Contact Information

Address: 14 Engineering Drive Hanover, NH 03755

Email Address: amfarid@dartmouth.edu, amfarid@mit.edu

Phone:

- Cell: +1 (646) 724-0264
- Office: +1 (603) 646-1524
- SkypeIn: +1 (860) 341-2775

Website:

- http://engineering.dartmouth.edu/liines
- http://amfarid.scripts.mit.edu

2.2 Personal Information

Citizenship: United States of America

Birthplace: New York City, NY, USA

Date of Birth: August 24^{th} 1978

2.3 Languages

English: Fluent

Arabic: Fluent in Colloquial & Modern Standard Dialects

Spanish: Fluent

French: Advanced/Superior Level

2.4 Principal Fields of Interest

The application of control, automation & operations research to intelligent multi-energy engineering systems. This rests upon:

Modeling of Dynamics Systems: The techno-economic modeling of dynamic systems across multiple application and energy domains.

Graph Theory: The study of the network sciences and its measures.

Systems Engineering for Large Complex Systems: The application of systems engineering and design methodologies for the engineering of integrated control, automation and information technology solutions for physical systems.

Control Systems Engineering: The design of robust control strategies for time-driven, event-driven, and hybrid systems.

Operations Management & Research: The operations and planning of large-scale complex networks on the basis of mathematical programming/optimization.

Technology Policy: The support of policy objectives in energy, water, transportation and industry through the lens of technology adoption, facilitation and standards.

2.5 Principal Application Domains

Smart Power Grids: As a full energy value chain including power generation, power transmission and distribution, and building systems. Electricity currently accounts for 29% of U.S. CO_2 emissions.

Energy-Water Nexus: Focusing on points of interconnection including power generation, desalination, water pumping, and building systems. Electricity currently accounts for 49% of U.S. water withdrawals.

Electrified Transportation Systems: Focusing on the multi-modal, connected, automated, shared and electrified mobility use case. Transportation currently accounts for 27% of U.S. CO_2 emissions.

Supply Chain Energy Management: Automated approaches to energy management in production and delivery of goods and services. Manufacturing currently accounts for 21% of U.S. CO_2 emissions.

Interdependent Smart City Infrastructures: This research theme represents a concerted effort to generalize sustainability and resilience to the emerging need for integrated smart cities. U.S. cities are home to 62.7% of the population, but comprise just 3.5% percent of the land area.

2.6 Professional Organization Membership

2015 - Present:	IEEE senior member
2020 - Present:	New York Academy of Sciences
2017 - Present:	INFORMS - The Institute for Operations Research and the Management Sciences
2012 - Present:	ASME - American Society of Mechanical Engineers
2011 - Present:	INCOSE - International Council on Systems Engineering
2012 - Present:	ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers
2010 - Present:	IISE - Institute of Industrial and Systems Engineers
2008 - Present:	ISA - International Society of Automation
2008 - 2014:	IEEE - The Institute for Electrical and Electronics Engineers
2008 - 2009:	IEMA - Institute of Environmental Management & Assessment
2013 - 2015:	ADS - Association for Demand Response & Smart Grid

2.7 Professional Registration

2009:	Engineer-in-Training. Boston, MA
2009:	ISO 9001 Quality Management System External Auditor
2009:	ISO 14001 Environmental Management System External Auditor

2.8 Awards Received

2013:	Best Applied Research Paper Award at GCC CIGRE Conference
2013:	Siemens Middle East Student Micro-grid Team Competition Finalist
2013:	4 Honorable Mention Paper Awards at the International Conference on Axiomatic Design
2003-2006:	Auto-ID Centre Cambridge Research Assistanceship
2000-2002:	National Science Foundation Research Assistanceship
1997-2000:	Pi Tau Sigma Mechanical Engineering Honor Society Member
1996-2000:	MET-Life Foundation Scholarship
1996:	United States Congressional Certificate of Merit
1996:	Bausch & Lomb Science Scholarship